Report of the External Review Committee of the Research Institute for Mathematical Sciences

Kyoto University

October 2012

submitted on behalf of the Review Committee by its Chairman Jean-Pierre BOURGUIGNON

Introduction

The Research Institute for Mathematical Sciences (RIMS) is renowned throughout the world as a major infrastructure for mathematical research. Founded in 1963 as a global research facility in mathematics for Japan, it was given the mission of enhancing research in the mathematical sciences and of giving it more international visibility. It is articulated under three headings: high level research, graduate training and postdoctoral hosting, conference facility. Since then it has developed as a major player on the world mathematical science.

It is now a division of Kyoto University and has its main building on the campus of the University.

A Review Committee, whose composition is detailed in Appendix A, was set up at the initiative of Professor Shigefumi MORI, Director of RIMS.

The Review Committee was tasked with assessing the performance of RIMS, taking its remit as a basis, identifying the current difficulties faced by the Institute, and, if at all possible, anticipating some of the new problems that may appear in the near future.

The Institute produced a 67-page self-evaluation document containing a large volume of useful information on the Institute itself (its structure, financing, scientific personnel and staff and so on). It was sent to the Review Committee members before their visit.

The detailed procedure followed by the Review Committee during its 2-day visit to Kyoto is described in Appendix B. The site visit gave a great opportunity to members of the Review Committee to be in direct contact with a number of mathematicians at RIMS, to get a better idea of the facilities and also to ask directly a number of questions on several issues. The Committee prepared a rough draft of their report while on site, in particular during a long evening session at the end of the stay.

The members of the Review Committee want to thank Professor Shigefumi MORI and Professor Hisashi OKAMOTO for their warm hospitality and for providing all the information requested by the Review Committee beyond the already extensive self-evaluation report, but also the Institute's staff for its support, and in particular Ms Kyoko Price for the remarkable care she took of the practical organization of the visit and its environment.

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Executive Summary

A General Comment

Although it is widely acknowledged that Mathematics plays a vital role in establishing the setting of quantitative science, we should stress its growing role in the present development of almost every branch of science, including the social sciences, engineering and medicine.

While this is often taken in a narrow sense, as referring chiefly to by now routine applications of long-established mathematics, it is striking how also the most abstract branches of current fundamental mathematics may have a revolutionary and completely unpredictable impact on recent technological developments that have transformed and are transforming society as a whole. This new dimension is of great importance in connection with the development of the research conducted in mathematics as well as in the employment of mathematicians.

Findings

- 1. Research directions at RIMS include many of the most active branches of current mathematical research. They are developed there at the highest level. RIMS must be viewed as a key asset for the future health of Japanese mathematical research.
- 2. RIMS provides an excellent setting for graduate training as well as for hosting postdoctoral fellows, who, often, come with their own support, typically from JSPS. This is now done in closer collaboration with the Mathematics Department of Kyoto University.
- 3. The functioning of RIMS as a Joint Usage/Research Centre (JU/RC), including the workshop and international networking aspect of its activities, is extremely satisfactory. Its activities regarding this aspect are at the same level as the other institutes having similar functions in North America or in Europe.

A special feature of RIMS is the added value gained from the interplay between the three components of its activities. A recurring theme in discussion with RIMS members at all levels is the benefit to their work of the constant stream of workshops and international visitors.

- 4. The Review Committee welcomes the recent decision of RIMS to employ assistant professors for a fixed, though substantial, time period. RIMS is going to encourage its assistant professors to gain some teaching experience in their second term to help them in their subsequent career, and to prepare them for a smooth change of status.
- 5. The facilities at the disposal of RIMS have recently been substantially renovated, but one result of this has been to aggravate the lack of space, that was already highlighted in previous evaluation reports as a serious impediment to the development of the Institute.

The technical staff working for the Institute is adequate as things stand, and is highly appreciated for its efficient work in dealing with all bureaucratic aspects of supporting the various needs of mathematicians at the Institute.

Recommendations

- 1. RIMS must be encouraged to keep its well-established tradition of hiring permanent staff of the highest calibre.
- 2. In view of the outstanding quality of the research conducted at RIMS, its appeal as a major graduate training centre should be enhanced, and in particular some emphasis should be given to attracting international students. The same applies to postdoctoral fellows.
- 3. International participation in the workshops organized at RIMS should be encouraged, while at the same time preserving the specific nature of some of the meetings primarily intended as domestic gatherings, giving young Japanese mathematicians the chance to present their results to an audience of the best national experts.
- 4. It seems desirable to the Review Committee that RIMS should encourage more extended visits by international experts; there were 26 foreign visitors, excluding students and post docs, staying for one month or longer in the academic year 2011; the number is fairly small compared with research institutes of a similar standing in the world whose mission is to host visitors along with some permanent scientific personnel.
- 5. The problem of space is a real obstacle to the development of RIMS, which is now obliged to use several locations dispersed around the Kyoto University campus in addition to its main building. To solve this problem, with adequate office space located in at most two sites, has become an absolute priority for RIMS.
- 6. Every effort should be made to keep the RIMS staff at the same level in terms of numbers and quality, despite the seeming inevitable changes in its statutes.

1. Assessment of the Remit of RIMS

According to its remit, RIMS has been designed to perform three functions:

- conducting high level research,
- delivering graduate school education and creating a stimulating environment for postdoctoral fellows,
- serving the mathematical community in Japan through the hosting of a large number of conferences.

This makes RIMS the East Asian equivalent of the Princeton Institute for Advanced Study, the Institut des Hautes Études Scientifiques located in Bures-sur-Yvette and the Bonn and Leipzig Max Planck Institutes for the part concerning the development of high level research, the Berkeley MSRI, the Cambridge Newton Institute or the Paris Institut Henri Poincaré for the part dealing with special activities, or for the part connected to the organization of workshops to the Oberwolfach Mathematical Research Institute, the Banff Institute or the Luminy Centre International de Rencontres Mathématiques in France.

An appropriate organization of RIMS, whose legal structure has varied in time, has been set up for these purposes, and currently ensures that RIMS achieves its goals with respect to all three of its missions. At present, RIMS is a structure incorporated within Kyoto University. The policy decisions of RIMS are made by the Executive Board, the Advisory Board, and the Technical Board, the latter two of which include members from outside Kyoto University.

Since the creation of RIMS, the mathematical sciences have undergone major developments, and the roles mathematicians play in society at large has broadened. Many examples of this can be given: for example, theoretical work on the abstract foundations of logic led to the original development of the computer, but many other aspects play a crucial role in the certification of the validity algorithms; the application of sophisticated number theory has become standard in information security; discrete mathematics and algebraic geometry play a role in the creation of a number of computer algorithms; the Itô stochastic calculus has contributed greatly to the transformation of the financial industry; sophisticated statistical processes are central to the analysis of the genome; non-Euclidean geometries in the study of phyllotaxis or complicated networks such as the internet, and so on.

This new situation is well represented in the variety of workshops organized at RIMS. It should of course also affect other activities of the Institute in the most timely and well prepared fashion. The new title *centre for Research Interaction in Mathematical Sciences* given in April 2012 to one of the programmes that RIMS supports reflects this new twist given to the Institute's activities.

1.1 Research Conducted at RIMS

Since its foundation in 1963, RIMS has played an outstanding role in mathematical research and is internationally recognised as one of the leading research centres in mathematics and the mathematical sciences.

Many of the RIMS members are outstanding researchers, and the recipients of numerous prestigious prizes and honours. The list includes two Fields medals, two Wolf prizes and the first Gauss medal. In this respect, RIMS is head and shoulders above any other mathematical institutions in Japan and is comparable with the best mathematics departments worldwide.

Several research fields of mathematics were created and developed by current and former members of RIMS. These include: stochastic analysis by K. Ito; algebraic analysis by M. Sato, T. Kawai, M. Kashiwara, M. Saito and others; higher-dimensional birational geometry by S. Mori.

It is obvious that the scholarly quality of the faculty is the most important factor that qualifies RIMS as a leading research institution. In order to maintain the level of the research, the faculty members who are appointed or promoted are required to be highly talented and show outstanding promise in research. They are carefully selected by the professors and formally endorsed by the Advisory Board.

The selection is successful for full professors and associate professors.

As for assistant professors, the selection process has been more problematic because of the unpredictability of the future; however, the introduction of non-tenured positions for assistant professors helps increase the fluidity and flexibility of junior faculty.

RIMS researchers conduct world-class research in both pure and applied mathematics, including central areas of mathematics such as arithmetic geometry, algebraic geometry, symplectic geometry, representation theory, algebraic analysis, stochastic analysis, fluid mechanics, theoretical computer science and others.

1.2 Graduate Training Programme

While Tokyo University has by far the biggest graduate training programme in Mathematical Sciences in Japan, Kyoto University comes second or third in numerical terms. RIMS is an extremely important component of this, in partnership with the Kyoto University Department of Mathematics.

As of 2012, RIMS has 19 MSc students and 17 PhD students. With its world class team of research workers, the graduate training offered by RIMS is of the highest quality. The bulk of its MSc students go on to a PhD, and most of its PhDs go on to postdoctoral positions or to tenured jobs at other Japanese universities.

In Japan students usually continue with their graduate training in the department in which they did their undergraduate studies, and often with the professors with whom they have had contact as undergraduates. Since the faculty of RIMS does not teach undergraduates on a regular basis, this can cause problems with graduate recruitment. One way of alleviating this problem is for RIMS faculty to run seminars for advanced undergraduates. In addition, from next year, RIMS and the Mathematics department will run a joint written graduate entry exam, though the two institutions will still conduct separate interviews with candidate students.

As a follow-up step to PhD training, RIMS also has an active postdoctoral programme that attracts many excellent PhDs from other Japanese universities. Between 2006 and 2012 about 100 young mathematicians have benefited from postdoc position at RIMS, many funded by the GCOE grant or individual JSPS grants. Because RIMS is such an attractive venue for research mathematicians, there has been good competition for these grants.

1.3 Cooperative Research Institute

In 2010 RIMS was nominated by MEXT as the Joint Usage/Research Centre in Mathematics. Its function is to act as a focus for cooperative mathematical research throughout Japan. (In effect, this continues a tradition extending back several decades under a new title.) In performing this role, RIMS runs activities of several kinds.

In numerical terms, the most significant activity is the series of symposia and research workshops. These are organised by mathematicians from anywhere in Japan, and cover the whole range of mathematics. 78 of these were run in 2011, attracting around 4400 participants, including 485 from overseas. Small focused meetings of this kind are probably the most valuable type of mathematical conference. In running these, RIMS performs for Japan the same role as Oberwolfach in Europe, or the Banff International Research Station in North America. This activity of RIMS is extremely valuable in providing focus and cohesion for mathematical research throughout Japan.

Camp-style seminars are closed seminars, with a small number of Japanese and overseas researchers, often held in retreat style at locations outside RIMS.

1.4 RIMS as International Centre

The core of RIMS activities as an international research centre are the International Research Projects, which have been run since 1991. Each year one or two special topics are selected (in 2008 for example these were 'Discrete Structures and Algorithms' and 'On the resolution of singularities'). RIMS holds several workshops in the selected area, and receives high level international visitors, who come for periods of a few weeks to several months.

RIMS has 3 Foreign Visiting professor positions, that can be held by a visiting international scholar for a minimum of 3 months; thus up to 12 scholars per year can be funded. Additional visitors are funded from other sources, including JSPS Grant-in-Aid from individual researchers, the Global COE programme (that finishes soon), and other sources.

Accommodation for visitors is provided by hotels and guest houses, in particular the Shugakuin International House of Kyoto University, and the Kitishirakawa Guest House. These meetings require significant logistic backup, which is very ably performed by the RIMS staff. The staff also plays a valuable role in assisting international visitors settle in Kyoto, which can be a difficult process for visitors unfamiliar with the Japanese language.

1.5 International Dimension

International project research: RIMS has run "international project research" events in key areas of mathematics since 1991. There have been approximately two of these per year since 2002. They usually involve 30 to 40 prominent international participants, and frequently produce a published volume of proceedings.

International visitor programme: RIMS currently hosts approximately 8 to 10 international visitors per year for visits of 3 to 6 months. Every year it offers 3 to 4 foreign visiting chairs (with a contractual obligation to spend at least 3 months at RIMS). It also invites other visitors for extended periods on "Visiting Research Scholar" or "Guest Research Associate" positions. There are also shorter term visitors and workshop participants, RIMS has around 350 foreign visitors per year if one included foreign mathematicians that attend workshops at RIMS.

International networking: RIMS has formal institution level International Academic Exchange agreements with institutes in Korea, Canada, Germany, Italy and Pakistan. RIMS takes an active role in PRIMA (Pacific Rim Mathematical Association) and is the Japanese participant in IMSI (International Mathematical Sciences Institutes).

2. Facilities and Resources

In view of the three missions given to RIMS, its needs in terms of facilities and resources are quite varied. It is to be noted here that in all other major countries that developed large mathematical infrastructures of a similar nature, the responsibility of taking up these missions is given to separate structures making it possible to have staff adapted to the specifics of each mission.

2.1 Facilities

Office space has been a problem for RIMS for many years now. After the complete renovation and upgrading of the original building vis-à-vis earthquake hazards, the area available has substantially decreased. A temporary solution has been found in attributing rooms to RIMS in three different buildings, one nearby, another already quite far and the last definitely far from the main building. Such a setting certainly complicates substantially contacts between researchers. We make special mention of the isolation of some of the postdoctoral fellows resulting from the remoteness of their office, whereas exposure to the leading scientists and visitors of the Institute is one of the main purposes of their position at RIMS.

Even with this awkward solution, the space available for RIMS researchers and staff is well below an adequate level. The minimal solution for RIMS is that it should be housed on at most two sites, and occupy a minimum of 7,500 square meters, a figure that would fit the official estimates for the number of research workers and staff employed at RIMS.

Housing facilities for short term visitors seem adequate. If the number of long term visitors is increased, as it seems desirable, a special effort will have to be devoted to help them with housing.

2.2 Administrative Staff

By simplistic numerical comparison with European and American research institutions, one might argue that the administration of RIMS is well staffed. However, this is not the case, if one takes into account the three distinct roles RIMS is playing, as well as the complicated internal regulations ruling Japanese universities and the geographic, linguistic and cultural conditions specific to Japan in its relation with international visitors.

RIMS faculty cannot shoulder the burden of daily administrative work done by the staff. For this they need the support of competent clerical staff, secretaries, librarians and technicians to host many hundred foreign visitors each year, arrange the conflicting schedules of parallel conferences, prepare for the graduate course entrance examination, cope with requests for photocopy of old journal articles, maintain the computer system and process the large volume of paperwork accompanying all the services.

The administrative staff should be maintained at the current level because the three missions of RIMS require that the staff be in regular contact with a number of mathematicians outside RIMS and make a number of practical arrangements with them.

Any sharp cutback for one reason or another would hamper important activities of RIMS, eventually damaging its standing as a leading international research centre.

2.3 Financial resources

The mechanisms by which RIMS has been funded has varied with time according to the administrative structures it is involved in. The current budgetary situation of the Institute seems as a whole to be rather adequate in strictly financial terms, as compared with the resources available to other international institutes of a similar size and stature. Nevertheless, we should point out that such a priori comparisons can be problematic, as it is hard to know that one is comparing like with like. Thus the expenses to be covered may vary considerably from one institute to the next, with some services provided free of charge or at much less than their real cost.

The support of research comes partly from the grants won individually or in small teams by researchers at RIMS. This of course gives some more freedom to the development of research.

There is at present no breakdown of the budget into the different missions undertaken by the Institute, and the way the budget is presented does not makes is easy to separate expenses under the three headings. This would be a useful device, allowing an overview of the extent to which each mission is adequately funded. It would also facilitate the comparison with institutes in other countries where, as said elsewhere, the three functions are undertaken by different institutions.

The allocation of positions is presently not only frozen, but actually subject to a limitation of its use, preventing the nominal vacancies from being filled. This could of course prove a serious handicap if RIMS wanted to act quickly to attract an outstanding researcher, a capacity that is actually very important for a leading institute such as RIMS.

The main concern seems to relate to the changing regulations that applies to staff members; this has the potential to affect severely the ability of the Institute to keep qualified personnel, when it is of paramount importance to have staff members performing competently and efficiently.

2.4 Computing Facilities

Most researchers at RIMS have relatively modest computing needs, which are met by desktop and laptop computers purchased using the individual researcher's JSPS Grantin-Aid. However, some groups, such as the numerical analysis group, have much greater needs; some of these are supplied by a vector processor in the RIMS basement, and in addition RIMS researchers have access to university supercomputing facilities. RIMS also has a terminal room for the use of visitors and students. While researchers usually purchase their own computers, these need software updates, and network connections, and visitors laptops need to be connected to the RIMS network. Thus RIMS also needs computer support staff; from what we were told, it is clear that the current staff are efficient and helpful.

2.5 Library and Publications

The library of RIMS is an important national resource, since many smaller Universities can no longer subscribe to a full range of journals.

RIMS also supports research by its publication activities. It issues three kinds of publications. The first of these is the journal "Publications of the Research Institute for Mathematical Sciences", founded in 1964. From 2010 this journal has been published by the European Mathematical Society, and is available on-line as well as in printed form.

Next is the series Kôkyûroku, mainly the proceedings of the various conferences supported by RIMS. These are now published online, but a small number (about 6 per year) are selected to be printed as part of the "RIMS Kôkyûroku Bessatsu" series. These special volumes consist of refereed papers, and are reviewed in Mathematics Reviews and Zentralblatt Math

3. Issues to be Tackled in Connection with the Missions

3.1 Research

Full professor and associate professor positions at RIMS currently work very well, with several really outstanding individual research workers, and the large majority producing strong research output.

The employment contracts of assistant professors at RIMS have recently changed, making the position into a fixed term job of 5 years, normally without extension. The review panel strongly supports this move. Since these are temporary positions, with the expectation that the individual will go on to a tenured job elsewhere, an assistant professor should be offered monitoring from a senior member and advice on career development.

A position as assistant professor at RIMS provides a young academic with unusual opportunities for medium term research visits to foreign universities, at a point in their career where these may be particularly useful in terms of enhancing their experience and their visibility. In some cases it would be desirable that assistant professors be given the possibility to teach graduate courses, since such teaching experience will improve their employment opportunities.

3.2 Graduate and Postgraduate centre

The graduate training programme is essential to the continued health of the research environment at RIMS, and needs to be maintained and expanded, with every effort made to attract good quality applicants to its MSc and PhD programmes.

While a traditional weakness of RIMS is that it has been disconnected from a regular supply of local graduate student applicants because it has no undergraduate teaching, we hope that this can be remedied to a large extent by the teaching activities of its younger members, together with the new structure of graduate school joint with the Kyoto University Mathematics Department.

With the GCOE programme drawing to a close, some care needs to be given to finding other support, including JSPS grants that individual students can apply for, the Grantsin-aid of many of the RIMS staff, and other sources of funding.

3.3 Workshops and Conferences

About one quarter of the workshops run by RIMS are of a fully international character, similar to those at Oberwolfach, Luminy or Banff. However, many others are of a domestic nature, with only few participants from overseas. While it can be argued that these more domestic workshops play a useful role for Japanese mathematics, there are strong reasons for RIMS to encourage workshop organisers to adopt a more international viewpoint where appropriate, for example by appointing international organisers or members of a scientific committee.

While the large majority of RIMS workshops are intended solely as research activities, other centres around the world find it convenient to include some workshops or schools with a training component; there may be some advantage in this also for RIMS, for example to introduce Japanese mathematicians to some new subjects in world mathematics.

At present, workshops are chosen by the Technical Committee of the Advisory Board from all those that apply, with little in the way of rigorous selection. There may be scope for the Advisory Board to solicit applications in prominent areas of advance, or to select them based on strategic priorities.

3.4 Outreach Activities

RIMS has developed a well attended series of lectures aimed at the general scientific public in the form of a yearly session of a few days with outstanding lecturers. In a different spirit a seminar entitled "Modern Mathematics and Mathematical Sciences, Basic Concepts and their Application to other Disciplines" has been offered to freshmen at Kyoto University. In the first semester of 2012, 14 lectures were given covering the field of Mathematics very broadly. Some lectures touched interfaces of Mathematics as the title suggests.

RIMS is certainly in a very good position to develop such activities and should be complimented for these efforts. Two comments may be in order:

- Explicit involvement by scientists of other disciplines explaining their interest for and need of Mathematics could be a good addition to the already existing formats;
- Well prepared and advertised events with the general public in mind could also be considered as ways to position Mathematics in the public debate; appropriate opportunities to do that successfully have to be identified and created.

3.5 National and International Networking

RIMS has concluded exchange agreements with other institutes in Japan, and also with international institutes in Korea, Pakistan, Italy, Germany and Canada. These agreements are very useful in maintaining the international profile of RIMS, and in facilitating short and medium term research visits. (Of course, the many strong researchers at RIMS also have numerous opportunities to visit other international institutions through their own research contacts.) We regard these network agreements as valuable, and encourage RIMS to continue to form networks in this fashion.

Appendix A

List of Members of the Review Committee

- Martin BARLOW, FRS Professor, University of British Columbia, Vancouver, Canada
- Jean-Pierre BOURGUIGNON (Chairman)
 Directeur de recherche, Centre National de la Recherche Scientifique;
 Director, Institut des Hautes Études Scientifiques, France
- Yoichi MIYAOKA
 Professor, University of Tokyo, Japan
- Miles REID, FRS
 Professor, Warwick University, United Kingdom
 Director of Warwick Mathematics Research Centre

Appendix B

Description of the Evaluation Process

Members of the Review Committee received the self-evaluation report produced by the RIMS Executive Board ahead of the visit.

On the morning of Monday October 29, an extended presentation of the self-evaluation report was made by Professor Shigefumi MORI, Director of RIMS, accompanied by members of the RIMS Executive Board, followed by a questions and answers session.

The rest of the site visit was dedicated to exchanges with faculty members and postdoctoral fellows in several sessions, as well as visits of the facilities available for RIMS (library, offices in the various parts of the campus where they are located).

At the end of the site visit, after the Review Committee had already formed some idea of the general points it would like to make in its report, a final session of questions and answers with Professor Shigefumi MORI.

Members of the Review Committee interviewed individually the following professors: Takashi KUMAGAI, Takuro MOCHIZUKI, Shigeru MUKAI, Tomotada OHTSUKI, Hisashi OKAMOTO, Kaoru ONO, Akio TAMAGAWA, Michio YAMADA.

The Review Committee interviewed the following associate professors and lecturers: Tomoyuki ARAKAWA, Ryoki FUKUSHIMA, Kazuo HABIRO, Yuichiro HOSHI, Masayuki KAWAKITA, Shin-ichi TAKEHIRO, Izumi OJIMA, Morihiko SAITO, Kazushige TERUI.

The Review Committee interviewed the following assistant professors: Mitsui ABE, Stefan HELMKE, Naohiko HOSHINO, Naoki IMAI, Kei IRIE, Shin-ya KATSUMATA, Hiraku KAWANOUE, Masatsugu NAGATA, Takuya OOURA, Shichi TANIGAWA.

The Review Committee interviewed the following postdocs: Kazuki HIROE, Takehiro KINOSHITA, Takahiro KITAYAMA, Qinlong LI, Kenshi MIYABE, Tomoyuki MIYAJI, Hiroki SAKO.

For the Assessment of RIMS as an International Mathematical Research Center

October 29, 30, 2012

History (with emphasis on 2007-2012)

- 1963 AprilFounded as a co-operative research center in JapanAim: Promoting research in mathematical sciences
- 1975~ RIMS's own graduate course in the mathematical sciences at the Division of Mathematical Sciences
- 1991 "International Research Project" started (pp.18-22)
- 2003-2007 21st Century Center of Excellence Program
- (2004 Reformation of national universities in Japan)

2006 April Established Center for Research in the Frontiers of Mathematical Science (p. 52)



2007-2010 Ito Research Division of Mathematical Analysis (p.53)

2008-2012 Global Center of Excellence (GCOE) Program (pp.14-15)

2010 March The seismic strengthening work for the main building of RIMS was done

- 2010 April Approved as a Joint Usage/Research Center (p.16) (The system of CRC was changed to that of JURC.)
- 2012 April Established Center of Quantum Geometry (p.51)

2012 April Center for Research in the Frontiers of Mathematical Science was renamed Center for Research Interaction in Mathematical Sciences (p.52)

Organiz.2-6 / Faculty 7-12 / Funds13-16 / Activities 17-34 / Res.Supp.etc.35-50 / Centers 51-53 / Rest 54-55



Size

Quota of faculty members

Professors	Associate Professors	Assistant Professors	Total
13	14	15	42



4

Number of Overseas Visiting Researchers by Year

2006	2007	2008	2009	2010	2011
319	461	315	341	348	334

Total Budget (yen) including salaries for regular staff

2009	2010	2011
1,054,653,000	927,868,000	948,851,000

Organization



- Executive Board consists of the Director, the Professors of RIMS, and a few Professors of Kyoto University outside RIMS.
- Advisory board decides and makes proposals on basic policies for the cooperative research activities of the Institute.
- Technical committee screens the plans for cooperative research activities proposed by researchers throughout Japan.

Organiz.2-6 / Faculty 7-12 / Funds13-16 / Activities 17-34 / Res.Supp.etc.35-50 / Centers 51-53 / Rest 54-55

Functions of RIMS

- A research institute in mathematical sciences as a division of Kyoto University
- A part of the Graduate School of Science providing graduate level education in mathematics jointly with the Department of Mathematics (cf. "Report on Self-evaluation (August 2012)", p.42)
- JURC (Joint Usage/Research Center) serving the mathematical community in Japan (cf. p.16).

Faculty Members

Professors, associate professors and assistant professors: their numbers and age distribution (Their numbers are authorized by the government with necessary funds allocation.)



Organiz.2-6 / Faculty 7-12 / Funds13-16 / Activities 17-34 / Res.Supp.etc.35-50 / Centers 51-53 / Rest 54-55

7

The honors and prizes (2006-2012)

Year	Name	Position	Prize
2006, August	Kiyosi ITO	Professor Emeritus	IMU Carl Friedrich Gauss Prize
2006, November	Toshiyuki KOBAYASHI	Professor	Osaka Science Award
2007, March	Toshiyuki KOBAYASHI	Professor	JSPS Prize
2007, March	Huzihiro ARAKI	Professor Emeritus	Humboldt Prize
2007, April	Satoru IWATA	Associate Professor	Young Scientists' Prize
2008, March	Tomotada OHTSUKI	Associate Professor	JSPS Prize
2008, April	Masahito HASEGAWA	Professor	Young Scientists' Prize
2008, June	Masaki KASHIWARA	Professor	Fujiwara Prize
2008, June	Takuro MOCHIZUKI	Associate Professor	Yukawa-Tomonaga Memorial Prize
2008, September	Kazuo HABIRO	Lecturer	Mathematical Society of Japan, Geometry Prize

Year	Name	Position	Prize
2009, March	Hiroshi HIRAI	Assistant Professor	Operations Research Society of Japan Best Paper of the Year among Young Researchers
2009, April	Masayuki KAWAKITA	Associate Professor	Young Scientists' Prize
2010, March	Takuro MOCHIZUKI	Associate Professor	JSPS Prize
2010, March	Takuro MOCHIZUKI	Associate Professor	Japan Academy Medal
2010, March	Kenjiro TAKAZAWA	Assistant Professor	Operations Research Society of Japan Best Paper of the Year among Young Researchers
2011, June	Takuro MOCHIZUKI	Associate Professor	Japan Academy Prize
2011, September	Naoki IMAI	Assistant Professor	Mathematical Society of Japan, Takebe Prize
2012, February	Yuichiro HOSHI	Lecturer	Inoue Award for Young Researchers
2012, February	Takashi KUMAGAI	Professor	JSPS Prize
2012, May	Kazushige TERUI	Associate Professor	RTA 2012 - 23rd International Conference on Rewriting Techniques and Applications Best paper award

Members capable of attracting many international visitors

ICM Invited Speakers

2006 Madrid, Topology: Kaoru Ono

2006 Madrid, Operator Algebras and Functional Analysis: Narutaka Ozawa

2010 Hyderabad, Control Theory & Optimization : Iwata Satoru

Organizer, Scientific committee

2011 Spain, Resolution of Singularities and Related Topics: Shigefumi Mori

- 2011 Taipei, 9th Asian Symposium on Programming Languages and Systems (APLAS2011): Masahito Hasegawa
- 2011 Banff International Research Station (BIRS), Workshop Foundations of Stochastic Analysis: Takashi Kumagai
- 2011 Bonn Univ., 5th International conference on Stochastic Analysis and its Applications: Takashi Kumagai
- 2012 Georgia Institute of Technology, ARC Workshop, "Modern Aspects of Submodularity" : Satoru Iwata

2013 London, UK-Japan Winter school. Nonlinear Analysis: Hisashi Okamoto

Invited Lectures

- Apr. 2011 Tianjin, China, Stochastic Partial Differential Equations and Related Topics : Takashi Kumagai
- Apr. 2011 Cambridge, Moduli Spaces : Shigeru Mukai
- May 2011 Switzerland, Swiss Knots 2011 : Kazuo Habiro
- Jun. 2011 Oberwolfach, Germany, Stochastic Analysis : Takashi Kumagai
- Jun. 2011 Linnaeus University, Sweden, FPP6 –Foundations of Probability : Izumi Ojima
- Jun. 2011 Nicholaus Kopernicus Univ., 43 Symposium on Mathematical Physics : Izumi Ojima
- Jul. 2011 Univ. of Melbourne, Geometry & Topology Down Under: Kazuo Habiro
- Aug. 2011 Fields Inst., Arithmetic and Geometry of K3 surfaces and Calabi-Yau Threefolds.: Shigeru Mukai
- Aug. 2011 Waterloo, Banach Algebras 2011 : Narutaka Ozawa
- Aug. 2011 Chinese Academy of Sciences, The 3rd Pan Asian Number Theory Conference : Naoki Imai
- Sep. 2011 Bonn, 5th international conferences on Stochastic Analysis and its Applications : Takashi Kumagai

Invited Lectures

- Sep. 2011 Cornell Univ., 4th Cornell Conference on Analysis, Probability, and Mathematical Physics on Fractals :Takashi Kumagai
- Sep. 2011 Beijing, The Fifth Sino-Japanese Optimization Meeting : Satoru Iwata
- Sep. 2011 Seoul, Korea, Periods and Moduli : Shigeru Mukai
- Dec. 2011 Austria, Argebraic versus analytic geomety : Masayuki Kawakita
- Dec. 2011 Pohang, Korea. 8th East Asia PDE Conference: Hisashi Okamoto
- Jan. 2012 Cameroon, Aloco-Seminar: Shin-ya Katsumata
- Feb. 2012 Eurandom, Netherlands, The expanding art of expansions : Takashi Kumagai
- Mar. 2012 University of KwaZulu-Natal, Durban, Mathematical Physics Seminar : Izumi Ojima

And many others

Grants-in-Aid for Scientific Research

YEAR	2006	2007	2008	2009	2010	2011	2012
TOTAL (thousand yen)	67,300	52,300	64,600	67,460	69,440	69,450	77,200
NUMBER	44	37	46	57	55	51	54



Global COE program

Based on assessments of the "21st Century COE Program" and verifications of its results to date carried out by Japan's Ministry MEXT from FY2002, a decision was made to establish "Global COE (Centers of Excellence) Program".

The program will provide funding support for establishing education and research centers that perform at the apex of global excellence to elevate the international competitiveness of the Japanese universities.

The program will strengthen and enhance the education and research functions of graduate schools, to foster highly creative young researchers who will go on to become world leaders in their respective fields through experiencing and practicing research of the highest world standard.

Projects of "Mathematics, physics, earth sciences", one of the 9 eligible fields of Global COE (GCOE) program have started in academic year 2008.

Along with the Department of Mathematics of Kyoto University, RIMS proposed a GCOE project "Fostering top leaders in mathematics - broadening the core and exploring new ground", which started in the same academic year. Professor Kenji Fukaya, Department of Mathematics of Kyoto University, is the leader of the project.

Joint Usage/Research Center

- Funds are allocated by the Government for carrying out cooperative research.
- Each JURC has to be authorized every six years.
- Proposals (for symposia, joint researches, visitors for at least two weeks, etc.) are made annually from throughout Japan.
- Screened by Technical Committee (its members are chosen on the basis of recommendations of the Science Council of Japan).
- RIMS Research Project (pp.18-22).
- RIMS Retreat-style Seminars (pp. 26-28).

International Research Activities

- International conferences, symposia, workshops
 RIMS Research Project since 1991
 - International conferences, symposia and workshops related to cooperative research and the Global COE Program.

Retreat-style Seminars

- Foreign visitors
- International academic exchange
- Joint Mathematical Colloquia with Dept. of Math.

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RIMS Research Project

In **1991**, RIMS ran an international cooperative research project on the general theme "Infinite Analysis".

The main part of the project was a three-month long workshop and its proceedings which consisted of 47 original papers.

Since then a project of the same kind has been held every year at RIMS.

The Research Projects are institutionalized. Maximum 1.5 M yen each.

RIMS Research Projects (since 1991)

- 1991 Mathematical Analysis of Infinite Degree of Freedom
- 1992 Unstable and Turbulent Motion of Fluid
- 1993 Moduli spaces, Galois representations and L-functions
- 1994 Study of algebraic combinatorics-emphasizing connections with other branches of mathematics
- 1995 BRS symmetry
- 1996 Higher dimensional algebraic varieties
- 1997 Analysis on homogeneous spaces and representation of Lie groups
- 1998 Combinatorial methods in the representation theory and related combinatorics
- 1999 Geometry related to string theory

- 2000 Reaction-diffusion systems: Theories and Applications
- 2001 Low-Dimensional Topology in the Twenty-first Century
- 2002 Stochastic Analysis and Related Topics
- 2003 Complex Dynamics
- 2004 Method of Algebraic Analysis in Integrable Systems
- 2005 Mathematics of the Navier-Stokes Equations and its Applications
- 2006 (1) Arithmetic Algebraic Geometry
 - (2) Theoretical Effectivity and Practical Effectivity of Grobner Bases
- 2007 Mirror Symmetry and Topological Field Theory

- 2008 (1) Discrete Structures and Algorithms(2) On the Resolution of Singularities
- 2009 (1) Mathematical Finance
 - (2) Qualitative Study on Nonlinear Partial Differential Equations of Dispersive Type
- 2010 (1) Functions in Number Theory and Their Probabilistic Aspects
 - (2) Perspectives in Deformation Quantization and Noncommutative Geometry

2011 (1) Operator Algebras and their Applications

(2) Minimal models and extremal rays



Minimal models and extremal rays, June 2011, RIMS Kyoto Univ.

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International conferences in the academic year 2011 (cf. Report on Self-evaluation (August 2006), pp.10--20)

- Hungarian-Japanese Symposium on Discrete Mathematics and Its Applications 2011.5.31-6.3
- School on Algebraic Geometry --Minimal models and extremal rays 2011.6.13-6.17 RIMS Project Research (1)
- Minimal models and extremal rays 2011.6.20-6.24 RIMS Project Research (1)
- RIMS Workshop on Methods in Industrial and Applied Mathematics 2011.6.27-6.29
- Mathematical and numerical analysis for interface motion arising in nonlinear phenomena 2011.7.12-7.14
- Modern approach and developments to Onsager's theory on statistical vortices 2011.8.28-8.31
- Nonlinear Analysis and Convex Analysis 2011.8.29-8.31
- C*-Algebras and Related Topics 2011.9.5-9.9 RIMS Project Research (2)

- Applications of RG Methods in Mathematical Sciences 2011.9.12-9.14
- Topics in Combinatorial Representation Theory 2011.10.11-10.14
- Aspects of Descriptive Set Theory 2011.10.19-10.21
- Operator Algebras and Mathematical Physics 2011.10.25-10.28 RIMS Project Research (2)
- Analytic Number Theory --related Multiple aspects of Arithmetic Functions 2011.10.31-11.2
- Geometry of Interaction, Traced Monoidal Categories and Implicit Computational Complexity 2011.11.7-11.11
- Structural study of operators via spectra or numerical ranges 2011.11.14-11.16
- Frontiers in Dynamical systems and Topology 2011.11.21-11.25
- Algebraic Number Theory and Related Topics 2011.11.28-12.2
- Winter School on Operator Algebras 2011.12.7-12.16 RIMS Project Research (2)

- Mathematical Studies on Independence and Dependence Structure-- Algebra meets Probability 2011.12.19-12.21
- Von Neumann Algebras and Related Topics 2012.1.9-1.13 RIMS Project Research (2)
- Algebraic Systems and Theoretical Computer Science 2011.2.20-2.22

International symposia and workshops in new style modelled after the "Taniguchi Symposia"

Small scale retreat-style seminar combined with larger scale open symposia.

Taniguchi Symposia from 4th in 1977 through 41st in 1997 were held in retreat-style with about 15 top level young participants, half from Japan and half from overseas, each followed by a larger scale symposium (very often at RIMS) open to the mathematical community in general.

[According to the Proceedings of the final Taniguchi Conference on Mathematics held in Nara 1998]

Retreat-style Seminars

- 1. Crystals and Tropical Combinatorics, 2008.8.26--8.30
- 2. Workshop on algebras in Lie theory, 2008.9.6--9.12
- 3. Mathematics and physics across the diversity of turbulence phenomena, 2009.7.9--2009.7.11
- 4. Mathematical Finance and related topics in economics and engineering, 2009.8.13--2009.8.15
- 5. Geometry of Interaction, Traced Monoidal Categories and Implicit Complexity, 2009.8.24-2009.8.28
- 6. Model Theory Kirishima 2010 New developments of "independence" in model theory, 2010.3.1--2010.3.5
- 7. Recent Developments in Resurgence Theory and Related Topics, 2010.6.27--2010.7.2

- 8. Diagram algebras and related topics, 2010.7.5--2010.7.9
- 9. On analysis of combinatorial structures and its applications for information theory, 2010.8.6--2010.8.9
- 10. Twisted topological invariants and topology of low-dimensional manifolds, 2010.9.13--2010.9.17
- 11. Noncommutative geometric approach to the index theory on singular space, 2009.10.18--2009.10.22
- 12. Galois theoretic arithmetic geometry, 2010.10.19--2010.10.23
- 13. Modern approach and developments to Onsager's theory on statistical vortices, 2011.8.28 --2011.8.31
- 14. Operator Algebra and Mathematical Physics, 2011.10.25 -- 2011.10.28
- 15. Representation spaces, twisted topological invariants and geometric structures of 3-manifolds, 2012.5.28 --2012.6.1
- 16. Geometry and Analysis on Discrete Groups, 2012.6.11 -- 2012.6.15
- 17. Algebraic Combinatorics related to Young diagram and statistical physics, 2012.8.6 --2012.8.10
- 18. Towards complete equipment of multiple-precision arithmetic with GPGPU, 2012.8.30--2012.9.3

Foreign Visitors

- Three foreign visiting professor positions are authorized by the Government with allocated funds.
- Overseas visitors through JSPS Grants-in-Aid and Global COE program
- Post-doctoral Fellows (JSPS and Global COE program) from overseas

The number (at most 12) of foreign visiting professors invited each for over 3 months 10 (2007), 12 (2008), 10 (2009), 11 (2010), 6 (2011)

For the list, see "Report on Self-evaluation (August 2012)", pp. 29–34.

Foreign Visitors through JSPS Grants-in-Aid, 21st Century COE program, Global COE Program, etc.

Year Country	'06	'07	'08	'09	'10	'11
Australia	3	9	4	3	5	5
Canada	5	11	14	6	7	12
China	11	24	13	15	19	11
Denmark	1	1	5	2	2	8
France	52	51	42	53	48	37
Germany	35	19	13	23	14	7
India	5	4	2	2	2	2
Italy	10	12	6	13	14	14
Korea	37	68	41	19	36	39
Russia	19	12	9	6	7	4
Sweden	1	2	1	2	3	2
U.K.	13	17	14	35	21	23
U.S.A.	64	102	70	74	91	74
Others	63	129	81	88	79	96
Total (people)	319	461	315	341	348	334

The number of Post-Doctoral Fellows from overseas through JSPS Grants and 21st Century COE program, Global COE program

Year	JSPS people	21COE, GCOE
2003	1	2
2004	3	2
2005	0	3
2006	2	4
2007	0	2
2008	1	1
2009	2	1
2010	0	1
2011	2	1

Foreign Speakers at the Joint Weekly Mathematical Colloquium with Dept. of Math. (Academic Year 2011)

- Ramamoorthi Ravi (RIMS & Tepper School of Business, Carnegie Mellon Univ.) : April 27, 2011
- János Kollár (Princeton Univ.) : May 18, 2011
- Yde Venema (RIMS & Univ. of Amsterdam) : May 25, 2011
- Jungkai Chen (RIMS & Taiwan National Univ.) : June 8, 2011
- Kenji Matsuki (RIMS & Purdue Univ.) : June 29, 2011
- Lin Weng (Kyushu Univ.): November 30, 2011
- Jie Wu (National Univ. of Singapore) : December 14, 2011
- N. Christopher Phillips (RIMS & Univ. of Oregon) : January 11, 2012
- N. Christopher Phillips (RIMS & Univ. of Oregon) : January 11, 2012
- Jun-Muk Hwang (KIAS) : January 26, 2012

Meetings under Global COE Program "Fostering top leaders in mathematics -- broadening the core and exploring new ground"

- **1.** Russia-Japan School of Young Mathematicians (2009.1.14 -- 2.2)
- 2. Kyoto Univ. Seoul National Univ. Exchange Program for Young Mathematicians (2009.2.16 – 2.18)
- **3.** First Friendship Meeting in Mathematics between Fudan and Kyoto Universities (2010.1.11 1.15)
- 4. 2nd GCOE Workshop for Young Mathematicians (2010.2.22 2.23)
- **5.** Doctorial Forum between Fudan-Kyoto Universities (2011.3.10 3.14)
- 6. Japan-Russia Summer School (2011.6.27 7.22)
- 7. The 3rd GCOE Workshop for Young Mathematicians (2012.2.20 -- 2.21). Fourth to be held in Seoul, Feb., 2012
- 8. Group actions and K-theory (2012.3.12 -- 3.15)

International Academic Exchange Agreements

- 1. Korea Institute for Advanced Study (KIAS) since 2000
- 2. Seoul National University (SNU), School of Math. Sci. since 2006
- 3. Pacific Institute for the Mathematical Sciences (PIMS) since 2009
- 4. National Institute for Mathematical Sciences (NIMS) since 2010
- 5. University of Bonn, Hausdorff Center for Mathematics (HCM) since 2011
- 6. National University of Science and Technology, Centre for Advanced Mathematics and Physics (CAMP) since 2011
- International School for Advanced Studies (Scuola Internazionale Superiore di Studi Avanzati) (SISSA) since 2012

Supporting Activities and Facilities

- Publications
 - "RIMS Kôkyûroku"
 - New Lecture Notes Series "RIMS Kôkyûroku Bessatsu"
 - Publications RIMS
 - RIMS Preprint Series
- Library
- Office Space
- Research Support Sections
- Accommodation

RIMS Kôkyûroku

Number of	Issues
Year	Number
2007	46
2008	47
2009	43
2010	56
2011	48

ISSN 1880-2818

数理解析研究所講究録1798

RIMS合宿型セミナー

Modern approach and developments to Onsager's theory on statistical vortices

京都大学数理解析研究所

2012年6月

On-line Publication of RIMS Kôkyûroku

Kyoto Univ. Repository http://repository.kulib.kyoto-u.ac.jp/dspace/

RIMS web page http://www.kurims.kyoto-u.ac.jp/ ~kyodo/kokyuroku/backnumber.html

ISSN 1880-2818 数理解析研究所講究録1798 RIMS合宿型セミナー Modern approach and developments to Onsager's theory on statistical vortices 京都大学数理解析研究所 2012年6月

"RIMS Kôkyûroku Bessatsu" (ISSN: 1881-6193)

Each volume is the proceedings of a conference held at RIMS. The Advisory Board of RIMS selects about 10 conferences to publish their proceedings in this new series from those held at RIMS every year.



RIMS Kôkyûroku Bessatsu B29:

Summer School on the Theory of Uniform Distribution ed. S. Akiyama April, 2012, 118pp, 700 yen+shipping

RIMS Kökyűroku Bennettu B30 Progress in Mathematics of Integrable Systems energie Transformer Content Transform RIMS Kôkyûroku Bessatsu B30: Progress in Mathematics of Integrable Systems eds. R. Hirota, D. Takahashi April, 2012, 241pp, 1,000 yen+shipping

Publications RIMS (on-line versions and special issues)

European Mathematical Society Publishing House Vol. 46 (2010)-http://www.ems-ph.org/journals/ RIMS Vol. 41 (2005)-- Vol. 45 (2009) http://www.kurims.kyoto-u.ac.jp/ J-STAGE Vol. 1 (1965)-- Vol. 40 (2004) http://www.journalarchive.jst.go.jp/japanese

Special Issues

Vol.41, No.4, December 2005, 186 pp, 10 articles

"Dedicated to Professor Heisuke Hironaka on the Occasion of His "Kiju", that is, His 77th Birthday"

Vol.45, No.1, March 2009, 227 pp, 7 articles

• "Arithmetic Algebraic Geometry"

Vol.47, No.1 March, No.2 June 2011, 670 pp, 18 articles

"The Golden Jubilee of Algebraic Analysis"

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Vol. 48 No. 2 pp. 235-476 June 2012





RIMS Preprint Series

(since 1964)

Year	Issues
2003	51
2004	43
2005	42
2006	50
2007	48
2008	35
2009	32
2010	30
2011	27



Bulletin (published in Japanese)



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Library

	2007	2008	2009	2010	2011
An annual increase (copies)	2,117	3,499	2,209	1,739	2,192
Expenditure of					
books purchased (yen)	5,426,000	5,331,000	5,857,000	4,971,000	8,921,000
A number of collection books (copies)	83,736	87,226	89,435	91,198	93,385



	2007	2008	2009	2010	2011
the number of					
journal purchased expenditure of	397	394	395	395	397
journal purchased (yen)	63,031,000	76,012,000	74,376,000	77,931,000	36,982,000

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SECTION	LAND	BUILDING	
		Built area	Floor space
RIMS Main Building	m	m	m
	1,310	777	3,832
Research Bldg. No. 4, 3F			286
			(8 rooms)
Research Bldg. No. 2, 4F			417
			(8 rooms)
North Comprehensive Education			250
and Research Building			(4 rooms)
TOTAL			4,785

Kitashirakawa Guest House	262	137	453
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Required space according to the "Government standard"



1. "Cooperative research service section" supports cooperative research activities including accounting and various publications.

2. The Secretariat is a section which provides secretarial services for the RIMS members and deals with the Publications and preprints. The website at http://www.kurims.kyoto-u.ac.jp is maintained by this section.

3. The International Research Support Office handles international relations and offers secretarial services to overseas visitors as well as to those who attend the international symposia or workshops held at RIMS.

Accommodations

Shugakuin International House
 Housing for visitors to Kyoto University

 Kitashirakawa Guest House (Kitashirakawa Gakusha) for visitors to RIMS or YITP only. Very inexpensive. (2,570 yen/day)

Kitashirakawa Guest House (RIMS, 2011)

RIMS, jointly with the Yukawa Institute of Theoretical Physics, provides inexpensive accommodations.

Number of International visitors



Outreach activities

RIMS lectures to the public--- Introduction to mathematics --- (since 1976)

The 32th August 2 -- August 6, 2010 participants 123 (total 427)

S. Iwata : From graph theory to combinatorial optimization K. Lleda : Mathematical understanding of natural phenomena

K. Ueda : Mathematical understanding of natural phenomena --mathematics of self-organization--

M. Kawakita : Evolution of the theory of minimal model

The 33th August 1 -- August 5, 2011 participants 102 (total 348)

T. Kumagai : Markov chain and mixing time --mathematics of card-shffling--

T. Mochizuki : Irregular singularities of a differential equation

H. Kawanoue : Introduction to resolution of singularity

The 34th July 30 -- August 3, 2012 participants 91 (total 312)

T. Arakawa : On infinite symmetries

S. Tanigawa : Rigidity of a graph and Matroid

S. Mochizuki : The "two-dimensional group-theoretic geometry" common to number fields and topological surfaces

Lectures for freshmen of Kyoto Univ. 2012 Modern Mathematics and Mathematical Sciences --- Basic Concept and its application to other disciplines ----

April 13 K. Terui From foundations of mathematics towards computer science -- how a computer was invented April 20 A. Kirillov Tales of Catalan numbers April 27 **K. Habiro** On the category theory and TQFT **May 11 M. Kawakita** From cubic surfaces to algebraic geometry May 18 T. Kumagai Random walks on complex figures May 25 T. Arakawa Introduction to the representation theory June 1 Y. Hoshi Arithmetic geometry on covers of projective lines **June 8** S. Helmke An introduction to error correcting codes June 22 N. Ozawa The Banach-Tarski paradox and von Neumann's problem June 29 M. Yamada Numerical computations and polynomials July 6 T. Mochizuki Introduction to the de Rham cohomology July 13 M. Hasegawa A story of the typed lambda calculus July 20 A. Tamagawa Elliptic curves and the number theory **July 27** S. Takehiro Mathematics of stability problems for fluid flows

Research Center for Quantum Geometry

- Research Center for Quantum Geometry was created in RIMS in April 2012, in order to create and develop the new mathematics field of quantum geometry.
- The Center consists of RIMS faculty members and Project Professors.
- At most 5 Project Professors are appointed, who may be paid or unpaid with terms from 2 months to 3 years.
- As of July 2012, 3 Professors, Prof. H. Nakajima (Head) and Prof. T. Mochizuki, and Prof. M. Kashiwara (Project Professor) belong to the Center.
- The Center has no allocated funds, and the budgetary request is being made.

Center for Research Interaction in Mathematical Sciences

- In April 2006, the Center for Research in the Frontiers of Mathematical Sciences was created in RIMS in order to meet recent trends in mathematics/mathematical sciences.
- Since then, many visiting researchers have been engaged in research activities as Project Professors.
- The Center was renamed "the Center for Research Interaction in Mathematical Science" when "Research Center for Quantum Geometry" was created in April, 2012.
- The rules for this Center are similar to those for the Research Center for Quantum Geometry.
- Researchers may visit RIMS, e.g., on their sabbatical leaves for joint research with its faculty members.

Kiyosi Itô Research Division of Mathematical Analysis

- In the International Congress of Mathematicians held in Madrid in August 2006, IMU Carl Friedrich Gauss Prize, newly established for outstanding mathematical contribution for applied mathematics, was awarded to Dr. Kiyosi Itô, Professor Emeritus of Kyoto University and the former director of RIMS.
- In commemoration of the prize, 60 million yen was contributed to RIMS by Nomura Holdings, Inc. From October 2010 to September 2010, Kiyosi Itô Research Division of Mathematical Analysis was set up by this donation with research project of Mathematical Analysis.

Incompatibility of the functions under the new system of national universities introduced in 2004

- RIMS is guaranteed to exist only if it is mentioned in the 6year plan of the university submitted to the Government.
- As a JURC it aims at maximizing benefit for the math.
 research community at large, while each university aims at maximizing benefit for its own specific interests.
- The budgetary request of RIMS to the Government can be proposed only through the university.
- The Government allocates funds for RIMS through the university without earmarking. The university may subtract some portion to balance funding for its other divisions.
- In the current budget system, RIMS has difficulty in getting funds to enlarge its buildings, which is indispensable as an international research center of excellence.

Future Prospects

- Closer relations with international institutions
- Balance of faculties in "Pure mathematics" and "Applied mathematics"
- Have a new building (700 m² increase in two years)
- Establish a more solid research supporting structure